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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* WAYNE JERALD HENSHAW,  
MAILVAGANAM MAHENDRAN, and HENRY BEHMANN

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Appeal 2009-013798  
Application 09/621,234  
to reissue U.S. Patent 5,783,083  
Technology Center 1700

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Decided: April 13, 2010

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Before ALLEN R. MACDONALD, *Vice Chief Administrative Patent Judge*,  
BRADLEY R. GARRIS, *Administrative Patent Judge* and  
FRED E. MCKELVEY, *Senior Administrative Patent Judge*.

GARRIS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's  
decision rejecting claims 15-18 and 24. We have jurisdiction under 35  
U.S.C. § 6.

We REVERSE.

### Statement of the Case

Appellants claim a system for withdrawing permeate from a liquid substrate while leaving particulate matter therein (claim 15). An embodiment of this system is illustrated in Figure 2 of Appellants' Drawing, which is reproduced below.

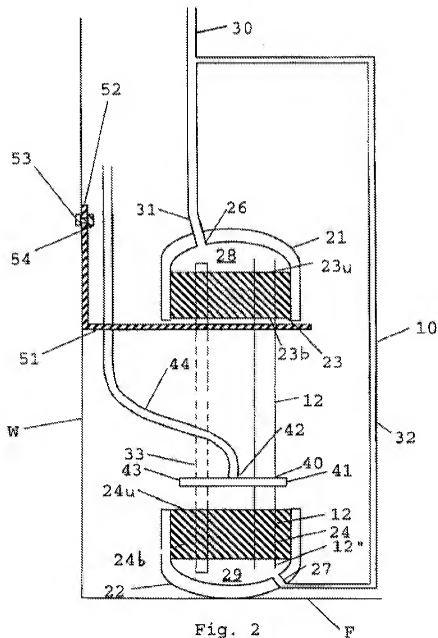


Figure 2 shows a system for withdrawing permeate from a liquid substrate.

Appellants' claimed system comprises an assembly (i.e., a skein) 10 having a plurality of hollow fiber filtering membranes (i.e., fibers) 12 immersed in the liquid substrate and disposed generally vertically between upper and lower generally cylindrical solid bodies (i.e., headers) 23, 24 comprised of a potting material with (i) the solid bodies having the membranes sealingly secured therein, "at least a portion of the membranes spaced apart from adjacent membranes by the potting material to a center to center distance in the range from 1.2 to 5 times the outside diameter of the membranes," (ii) lumens of the membranes being in fluid communication with permeate pans connected to the solid bodies 23, 24 and immersible in the liquid substrate, and (iii) the membranes having a length between the solid bodies in the range from 0.1% to 5% greater than the distance between the solid bodies (claim 15; Fig. 2; col. 11, ll. 25-59).

Appellants' claimed system also comprises a pump operable to apply suction to the lumens of the membranes and a gas-distribution system to produce bubbles in the liquid substrate (claim 15).

According to Appellants' disclosure, bubbles produced by the gas-distribution system serve the function of a scrub-brush for the outer surfaces of the hollow fiber filtering membranes (i.e., fibers), thereby maintaining the effectiveness of the assembly (i.e., skein) (abstract). This effectiveness is dependent upon the membranes (i.e., fibers) having a particular length and being disposed in the solid bodies (i.e., headers) so as to be kept free from contacting one another (i.e., spaced from one another), whereby "[l]ack of tension allows the fibers [i.e., membranes] to sway in bubbles flowing along

their outer surfaces making them surprisingly resistant to being fouled by build-up of deposits” (*id.*).

Representative claim 15 reads as follows:

15. A system for withdrawing permeate from a liquid substrate while leaving particulate matter therein, comprising,

(a) a non-pressurized reservoir other than a shell of a module for containing the substrate;

(b) an assembly having a plurality of hollow fiber filtering membranes immersed in the substrate each membrane having a length greater than 0.5 m, the membranes together providing a surface area of at least greater than 1 m<sup>2</sup> and disposed generally vertically between upper and lower generally cylindrical solid bodies comprised of a potting material with (i) the solid bodies having the membranes sealingly secured therein so as to prevent the substrate from contaminating the permeate, at least a portion of the membranes spaced apart from adjacent membranes by the potting material to a center to center distance in the range from 1.2 to 5 times the outside diameter of the membranes, (ii) lumens of said membranes being in fluid communication with a permeate pan connected to one of the solid bodies and immersible in the substrate or to a pair of permeate pans connected one to each of the solid bodies and both immersible in the substrate, and, (iii) said membranes having a length between opposed surfaces of the solid bodies, in the range from 0.1% to 5% greater than the distance between opposed surfaces of the solid bodies;

(c) a pump in fluid communication with said lumens of said membranes through at least one permeate pan, said pump operable to apply a suction to the lumens of the membranes to draw a component of the substrate as permeate through said membranes while leaving particulate matter in said substrate; and,

(d) a gas-distribution system having through-passages with openings distributed both radially and circumferentially between the membranes operable to provide a flow a gas through the through-passages to produce bubbles in the substrate.

The Examiner rejects claims 15-18 and 24 under 35 U.S.C. § 251 "as being an improper recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based" (Ans. 3).

In making the rejection, the Examiner made the following findings of fact and conclusions of law:

Claims 1 and 9 in [Appellants' original] application 08/690,045, now US 5,783,083, both have the following proviso:

the improvement comprising:  
each said header having said fibers spaced apart by a flexible support means having a thickness corresponding to a desired lateral spacing between adjacent fibers, said support means extending over only each terminal portion of said fibers near their ends, so as to maintain said ends in closely-paced apart relationship.

The proviso was added by amendment on January 12, 1998, along with extensive arguments of how the newly added limitation distinguishes the claimed invention over the prior art cited by the Examiner. At p. 7 of that amendment, for instance, the applicant's [sic] refer to the "flexible support means having a thickness corresponding to a desired lateral spacing between adjacent fibers" as the "second essential element" which gave their invention a clear advantage over the prior art. The record is clear, therefore, that the applicants surrendered broader coverage when they added the proviso to the claims in order to obtain a patent.

Claims 15-18 and 24 in this reissue lack that limitation and thus they are rejected under 35 USC 251 as involving an improper attempt to recapture surrendered subject matter. See MPEP 1412.02.

It is noted that claim 15 in this reissue includes limitations narrowing the scope of the claims as follow [sic, follows]: a pump; and

"at least a portion of the membranes spaced apart from adjacent membranes by the potting material to a center-to-center distance in the range from 1.2 to 5 times the outside diameter of the membranes",

these limitations were not recited in claims 1 and 9 of 08/690,045, now US 5,783,083. Nevertheless, claims 15-18 and 24 in this reissue are missing the aforementioned proviso, which was "an aspect to [sic] germane to a prior art rejection". Therefore, the claims are "broader in scope in some aspects and narrower in others".

(Ans. 3-5).

### *Issues*

(1) Does the broader aspect of reissue claim 15 relate to subject matter surrendered in the original prosecution?

(2) If so, has reissue claim 15 been materially narrowed in other respects, so that the reissue claims may not have been enlarged, and hence avoid the recapture rule?

*Findings of Fact*

Issue (1)

During prosecution of their original application 08/690,045, Appellants filed an Amendment on 12 January 1998 by which independent claims 1 and 9 were amended in view of a prior art reference to Kunio<sup>1</sup> (Amendment 6, first full para.). The so-amended claims 1 and 9 were ultimately issued as claims 1 and 9 of Appellants' US Patent 5,783,083 for which reissue is now sought in this appeal. Amended claims 1 and 9 are directed to subject matter representatively illustrated in Figures 2 and 4 of Appellants' Drawings. These figures are reproduced below:

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<sup>1</sup> In the record of this appeal, Appellants in essence concede that the claim amendments and arguments in the 12 January 1998 Amendment were made in order to patentably distinguish over Kunio (App. Br. 8, second full para.; Reply Br. para. bridging 4-5). We observe, however, that the Kunio reference had not been applied in a rejection by the Examiner during original prosecution. This fact has not been raised by Appellants or the Examiner as an issue in the appeal before us. Therefore, we will not consider or further comment upon this fact in our disposition of the appeal.





Figure 4:

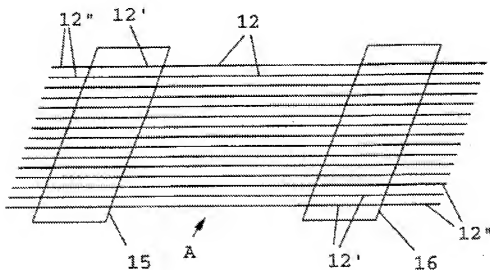


Fig. 4

Figure 4 shows an array of fibers disposed on spaced apart cards or flexible support means.

Amended claims 1 and 9 are adequately represented by amended claim 1 which is reproduced below wherein straight brackets denotes subject matter deleted by Applicants, underlining denotes subject matter added by Applicants, and curly brackets denotes subject matter added by this panel of the Board:

1. (Amended) In a gas-scrubbed assembly comprising, a microfiltration membrane device {e.g., skein 10 in Fig. 2} in combination with a gas-distribution means {e.g., sparger 40 in Fig. 2} to minimize build-up of particulate deposits on the surfaces of hollow fiber membranes ("fibers") {e.g., 12 in Fig. 2} in said device, and to recover permeate from a multicomponent liquid substrate while leaving particulate matter therein, said membrane device comprising,

a multiplicity of fibers, unconfined in a shell of a module, said fibers being swayable in said substrate, said fibers being subject to a transmembrane pressure differential in the range from about 0.7 kPa (0.1 psi) to about 345 kPa (50 psi);

a first and second header {e.g., 23, 24 in Fig. 2} disposed in transversely spaced-apart relationship within said substrate, each header being formed with a potting resin cured in a resin-confining means;

said first header and second header having opposed terminal end portions of each fiber sealingly secured therein, all open ends of said fibers extending from a permeate-discharging face of at least one header;

permeate collection means {e.g., 28, 29 in Fig. 2} to collect said permeate through at least one of said headers sealingly connected in open fluid communication with permeate-discharging faces of said headers;

means for withdrawing said permeate; and,

said gas-distribution means is located within a zone beneath said skein {sic, said microfiltration membrane device}, said gas-distribution means having through-passages therein adapted to have sufficient gas flowed therethrough to generate enough bubbles flowing in a column of rising bubbles between and around said skein {sic} fibers, to keep surfaces of said fibers awash in bubbles;

[the improvement comprising,]

said fibers, said headers and said permeate collection means together forming a vertical cylindrical skein wherein said fibers are essentially vertically disposed; said first header being upper and disposed in vertically spaced-apart relationship above said second header with opposed faces of said headers at a fixed distance, said fibers being substantially concentrically disposed relative to the vertical axis between said headers;

each of said fibers having substantially the same length, said length being from at least 0.1% greater, to less than 5% greater than said fixed distance so as to permit restricted displacement of an intermediate portion of each fiber, independently of the movement of another fiber; [and,]

the improvement comprising,

each said header having said fibers spaced apart by a flexible support means {e.g., 15, 16 in Fig. 4} having a thickness corresponding to a desired lateral spacing between adjacent fibers, said support means extending over only each terminal portion of said fibers near their ends, so as to maintain said ends in closely-spaced apart relationship,

said gas distribution means being disposed between said fibers and having through-passages adapted to discharge said bubbles which rise vertically substantially parallel to, and in contact with said fibers, movement of which is restricted within said column;

whereby said permeate is essentially continuously withdrawn [while concentration of said particulate matter in said substrate is increased].

(Amendment 1-2).

In their Amendment, Appellants made the following statements regarding the apparatus disclosed by Kunio and the apparatus defined by claim 1 (and claim 9):

The reference [to Kunio] discloses a skein having fibers which are deliberately longer than in a conventional skein, as are the fibers in applicants' invention. [Amendment 6].

Kunio discovered that if the excess length was set for 1% to 4%, an extended vertical skein can withstand the rigors of backwashing much better than with other excess lengths either less than 1% or greater than 4%. [*Id.*].

However, even with 1% "slack", Kunio observed some damage with each backwashing cycle as graphically illustrated in his Fig 3. [*Id.* at 6-7].

Applicants discovered that if the fibers in an extended skein were not bundled, but potted in spaced-apart relationship, spaced apart by a flexible means, there was no

damage to the fibers over an extended period. Applicants discovered that with spaced-apart fibers in headers of an extended skein, in which skein the specified “slack” may be in a range wider than the range Kunio required for survival of his skein during backwashing, skein fibers will be immune to the damage suffered by Kunio’s skein fibers, provided the ends of the fibers were potted in spaced-apart relationship in a header which was not rigid. [*Id.* at 7].

Accordingly, claim 9 has been amended to specify the first essential limitation (“slack”) in the preamble, and to define the second essential element. This second essential element is the “flexible support means having a thickness corresponding to a desired lateral spacing between adjacent fibers” in the headers. Claim 1 is directed to the skein of amended claim 9 in combination with gas distribution (typically, aeration) means. [*Id.*].

Appellants emphasized in their Amendment that Kunio’s fibers were conventionally bundled such that the fibers touch each other and “chafe against each other as they sway” (Amendment para. bridging 10-11). Appellants argued “[s]uch chafing simultaneously weakens the walls of the fibers and increases the likelihood of leakage of substrate between them” (*id.*). Appellants further argued that their claimed invention solved the chafing and leakage problem and expressed this argument as follows:

Applicants discovered how to solve the problem by avoiding bundling the fibers in contact with one and another. They sacrificed density of fibers to obtain better longevity (no fiber-to-fiber abrasion) and a leak-proof header. They did so by supporting spaced-apart fibers on a flexible support of desired thickness before potting the fibers, thus assuring a chosen spacing (specified by the center-to-center dimensions) between fibers in the header, and assuring the penetration of resin between every fiber. This additional

limitation has been introduced into the amended article claims to the skein. [Amendment 11].

Finally, in their Amendment, Appellants identified the descriptive support or basis for the claim 1 and claim 9 limitations “closely-spaced relationship” and “flexible support means” as being at page 12, line 7, and page 21, line 8, respectively in their Specification (Amendment 12). These page and line disclosures of Appellants’ original Specification correspond to column 7, line 45 (i.e., concerning the “closely-spaced relationship” limitation), and column 12, line 57 (i.e., concerning the “flexible support means” limitation), of Appellants’ ‘083 patent. This latter disclosure makes clear that the “flexible support means” of claims 1 and 9 is described in Appellants’ Specification with reference to flexible strips 15, 16 shown in Figure 4 of the Drawing (*see* col. 12, l. 50 – col. 13, l. 2).

#### Issue (2)

The narrowing limitation in reissue claim 15 that membranes are spaced apart “in the range from 1.2 to 5 times the outside diameter of the membranes” is disclosed in the ‘083 patent (col. 7, ll. 28-31) but is not recited in any of the patent claims. Nor does the limitation appear in any claim presented during prosecution of the application which matured into the ‘083 patent.

#### *Principles of Law*

Under the recapture rule, patentees are precluded from regaining the subject matter that they surrendered in an effort to obtain allowance of the original claims. *N. Am. Container, Inc. v. Plastipak Packaging, Inc.*, 415 F.3d 1335, 1349 (Fed. Cir. 2005).

We apply the recapture rule as a three-step process: (1) first, we determine whether, and in what respect, the reissue claims are broader in scope than the original patent claims; (2) next, we determine whether the broader aspects of the reissue claims relate to subject matter surrendered in the original prosecution; and (3) finally, we determine whether the reissue claims were materially narrowed in other respects, so that the claims may not have been enlarged, and hence avoid the recapture rule. *Id.*

A surrender can occur by way of either arguments or claim changes made during prosecution of the original patent application. Therefore, arguments made to overcome prior art can evidence an admission sufficient to give rise to a finding of surrender. *Hester Indus., Inc. v. Stein, Inc.*, 142 F.3d 1472, 1480-81 (Fed. Cir. 1998).

In determining whether surrender has occurred, the proper inquiry is whether an objective observer viewing the prosecution history would conclude that the purpose of the patentee's amendment or argument was to overcome prior art and secure the patent. *Yoon Ja Kim v. ConAgra Foods, Inc.*, 465 F.3d 1312, 1323 (Fed. Cir. 2006).

In the context of a surrender by way of argument, the recapture rule may be avoided when the reissue claims are materially narrower than the patent claims in other overlooked aspects of the invention. The purpose of this exception to the recapture rule is to allow patentees to obtain through reissue a scope of protection to which they are rightfully entitled for such overlooked aspects. *Hester Indus.*, 142 F.3d at 1482-83.

*Analysis*

Step 1 of the Recapture Rule Analysis:

Determine whether and in what respect the reissue claims are broader in scope than the original patent claims

On this record, the Appellants and the Examiner are in fundamental agreement that reissue claim 15 is broader in scope than original patent claim 1. Reissue claim 15 does not contain the “flexible support means” limitation of patent claim 1 (App. Br. 5-6; Ans. 3-4; Reply Br. 2).

Step 2 of the Recapture Rule Analysis:

Determine whether the broader aspects of the reissue claims relate to subject matter surrendered in the original prosecution

The Examiner determines that the broader aspect of reissue claim 15, namely, the “flexible support means” limitation of patent claim 1, relates to surrendered subject matter because, *inter alia*, Appellants presented arguments in the original prosecution that the limitation patentably distinguished over the prior art (Ans. 4). In response, Appellants disagree with the Examiner but explain their disagreement merely by stating that, during original prosecution, they “argued that the prior art Kunio device had membranes [i.e., fibers] that were in contact with each other and so not spaced at all” (App. Br. 8, second full para.).

The above principles of law establish that arguments made to overcome prior art can evidence an admission sufficient to give rise to a finding of surrender (*Hester Industries*, 142 F.3d at 1480-81) and that a determination of surrender is based on whether an objective observer viewing the prosecution history would conclude that the purpose of the



argument was to overcome the prior art and thereby secure the patent (*Kim*, 465 F.3d at 1323).

The findings of fact, *supra*, unequivocally show that, during original prosecution, Appellants presented arguments concerning the “flexible support means” limitation of patent claim 1 in order to distinguish over the Kunio reference. For example, Appellants presented the following arguments to the effect that their skein fibers are immune from the damage suffered by Kunio’s skein fibers:

Applicants discovered that if the fibers in an extended skein were not bundled, but potted in spaced-apart relationship, spaced apart by a *flexible support means*, there was no damage to the fibers over an extended period. Applicants discovered that with spaced-apart fibers in headers of an extended skein, . . . skein fibers will be immune from the damage suffered by Kunio’s skein fibers, provided the ends of the fibers were potted in spaced-apart relationship in a header which was not rigid. [Amendment 7, first full paragraph; italics added].

Accordingly, claim 9 has been amended to specify the first essential limitation (“slack”) in the preamble, and to define the second essential element. This second essential element is the “*flexible support means* having a thickness corresponding to a desired lateral spacing between adjacent fibers” in the headers. Claim 1 is directed to the skein of amended claim 9 in combination with gas distribution (typically, aeration) means. [*Id.* at second full para.; italics added].

An objective observer viewing the prosecution history of the ‘083 patent would conclude that the purpose of Appellants’ arguments, concerning the “flexible support means” limitation of patent claims 1 and 9, was to distinguish over Kunio so as to thereby secure the patent.

Significantly, this conclusion is not contested by the Appellants with any reasonable specificity in the record before us. Instead, Appellants merely present the earlier quoted statement that, during original prosecution, they had “argued that the prior art device had membranes that were in contact with each other and so not spaced at all” (App. Br. 8, second full para.). However, this conclusion is not relevant to whether the “flexible support means” limitation of claims 1 and 9 (i.e., the broader aspect of reissue claim 15) was argued and thereby surrendered during original prosecution. For this reason, we determine that the broader aspect of reissue claim 15 relates to subject matter surrendered in the original prosecution.

Step 3 of the Recapture Rule Analysis:

Determine whether the reissue claims were materially narrowed in other respects, so that the claims may not have been enlarged, and hence avoid the recapture rule

The Examiner and Appellants agree that reissue claim 15 is more narrow than patent claim 1 with respect to the claim 15 limitation “at least a portion of the membranes spaced apart from adjacent membranes by the potting material to a center to center distance in the range from 1.2 to 5 times the outside diameter of the membranes” (App. Br. 7, first full para.; Ans. para. bridging 4-5; Reply Br. para. bridging 4-5).

In order to assess whether this claim 15 limitation avoids the recapture rule, we must determine whether the limitation renders reissue claim 15 materially narrower in other overlooked aspects of Appellants’ invention. *Hester Indus.*, 142 F.3d at 1482-83.

We consider this narrowing limitation of claim 15 to be material because the record before us contains no rejection of the claims over prior art.<sup>2</sup> The absence of a prior art rejection evinces that the limitation, at least facially, patentably distinguishes claim 15 from the prior art and accordingly that the limitation renders the reissue claim narrower in a material sense. *See Ex parte Bradshaw*, 2007 WL 2138943 \*10 (BPAI 2007).

Furthermore, the claim 15 limitation is an overlooked aspect of Appellants' invention. As pointed out in the findings of fact above, the spacing range recited in this limitation (i.e., "a center to center distance in the range from 1.2 to 5 times the outside diameter of the membranes") is disclosed but not claimed in the '083 patent. For this reason, the spacing range limitation is an overlooked aspect of the invention disclosed by Appellants. *See id.*

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<sup>2</sup> We have not overlooked the Examiner's statement that "the new claim limitation e.g. spacing between potter membrane [sic] is old in the art as evidenced in Patent US 5,248,426 cited in the record" (Ans. 5). The Examiner's statement is not supported by specifically identified teachings in the referenced patent. Appellants do not appear to dispute the correctness of the Examiner's statement in the reply brief. *See, e.g.,* Reply Br, para. bridging 6-7. Instead, Appellants maintain that the U.S. patent is not "well known" enough "to make anything 'old in the art'." In addition, the Examiner's statement cannot be reconciled with the undisputed fact that no prior art rejection of claim 15 has been advanced by the Examiner in this appeal, including any rejection based on a combination of (1) Kunio (Japanese Patent Application No. Sho 61 [1986]-292045) and (2) Stillian (U.S. Patent 5,248,426). To resolve the issues before us on appeal, we have no reason to voice an opinion on whether the combination of references would render the claims unpatentable.

The Examiner does not consider the claim 15 limitation under review to be an overlooked aspect of Appellants' invention. The Examiner presents the following argument in support of this view:

A response to whether Applicants are claiming an additional invention or embodiment (overlooked aspects of the disclosed invention). To avoid recapture the claims in the new embodiment need to be directed to a "separate invention"; however, claims 15-18 and 24 are directed to the same invention or "system comprising a hollow fiber membrane system within a no pressurized reservoir", and the limitation "flexible support means . . ." is relevant to the invention of claims 15-18 and 24.

Hester Industries Inc. v. stein Inc. [Hester, 142F. 3d at 1482-83, 46 USPQ2d 1649-50];  
and

B.E. Meyers & Co. v. United States, 56 USPQ 2d 1110 (US CtFedCls 2000).

(Ans. 5).

We find nothing in the legal authority cited by the Examiner which supports the proposition that "[t]o avoid recapture the claims in the new embodiment need to be directed to a 'separate invention'" (*id.*). Rather, *Hester*, 142 F.3d at 1482-83, states that the recapture rule may be overcome "when the reissue claims are materially narrower in other overlooked aspects of the invention." Nothing in the Examiner's quoted statement supports the view that an overlooked aspect must relate to an invention separate from the one defined by the original patent claims.<sup>3</sup> Whether an invention was

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<sup>3</sup> The Examiner's view is far narrower than the Office's position found in MPEP § 1412.02 I. C. (Rev. 7, July 2008): "If, however, the reissue claim(s) are really claiming additional inventions/ embodiments/ species not originally claimed (i.e., overlooked aspects of the disclosed invention), then recapture will not be present."

overlooked depends on what was claimed in the patent or during prosecution of the application which matured into the patent.

*Conclusions of Law*

The broader aspect of reissue claim 15 relates to subject matter surrendered in the original prosecution.

Nevertheless, for the above-stated reasons, reissue claim 15 has been materially narrowed in other respects, so that the reissue claims have not been enlarged, and hence avoid the recapture rule.

It follows that we do not sustain the Examiner's § 251 rejection of appealed claims 15-18 and 24 as being an improper recapture.

*Order*

The decision of the Examiner is reversed.

REVERSED

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